



STEM: Preparing kids for a brave, new job market

California weighs science standards intended to help kids enter the 21st century workplace.

by Kelly St. John Regier

The fastest growing fields in terms of jobs are science, technology, engineering and mathematics, yet California's public schools have not kept up by offering a first-class STEM education.

However, many scientists and educators are hopeful that that will change soon. The State Board of Education is expected to vote later this year on whether to adopt new national science standards released earlier this year.

The Next Generation Science Standards were developed by California and 25 other states based on a

2011 framework by the National Research Council. It is the first effort in more than 15 years to transform the way science is taught in K-12 classrooms, an effort that comes amid widespread concern that children in U.S. schools are falling behind

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their peers around the world in science and math.

The new standards, released in April, require students to learn fewer basics but to delve into those more deeply and to not just memorize information but to understand how scientists investigated and gathered that information.

"I'm really all for these. It's going to be exciting to see how they're implemented," says Sue Neuen, executive director of Science@OC, a nonprofit organization that works to strengthen science, technology, engineering and math instruction in public schools.

"We've got to grow our own

scientists and engineers, and there's no reason we can't," Neuen says. "This kind of science is going to get kids to be innovators and not just users."

The impetus to look at STEM instruction in public schools has taken on a more urgent tone among business leaders and policy-makers who see science and math as critical fields for the nation's economic development.

A recent U.S. Department of Commerce study found that in the past 10 years, job growth in the STEM fields was three times greater than in other fields.

The new standards attempt to get away from instruction that is "a mile wide and an inch deep," says science educator Jackie Rojas, a member of the Science Expert Panel formed by state education superintendent Tom Torlakson. Instead, she says, the standards focus on fewer core disciplinary ideas, allowing students to practice science and engineering through projects.

"It is going to be a big change for most schools, most districts and most children," says Rojas. "We're going to



Matisyn Araiza, 7, of Huntington Beach plays with a Lego robot during the Kid 2.0 event at UCI. The day was intended to interest kids in science with hands-on games and science experiments.

ask our children to work hard for a deep understanding and practice like scientists and engineers."

One middle-school project, suggests Neuen, could be an inquiry into shadows,

asking students to figure out how to measure shadows being cast depending on the earth's changing position. Finding an answer would require science and mathematics, and writing skills would be

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needed to put together a final report.

At all ages, the new standards incorporate more engineering practice than exists in the curricula today, Rojas and Neuen note.

"Parents are going to hear a lot more about what's going on in science labs because it's not going to be boring," Neuen says.

Neuen says that Science@OC is already finding success with hands-on, project-based science units in some Santa Ana schools, a model of what education could look like statewide under the new standards.

One study found that in Santa Ana's Science@OC classrooms, 88 percent of students test at the proficient or advanced level on the eighth-grade STAAR test compared with just 31 percent in traditional classrooms, Neuen says.

The Next Generation Science Standards also mark the first time that standards would identify climate change as a core concept for science curricula. One proposed benchmark for high school would ask students to explain, based



Orange Lutheran High School honors engineering students Mikaela Strasser, left, and Lauren Byrne develop a packline and lift apparatus for their school for the International VEX Robotics competition.

on evidence, how climate change has affected human activities through such phenomena as altered sea levels and weather patterns.

In California, the proposed standards are being reviewed by a panel of science experts who will make recommendations

to the State Board of Education. The board is expected to vote in November on whether to accept, modify or reject the standards. Changes could be implemented as early as 2014.

To learn about the Next Generation Science Standards, go to nextgenscience.org.

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